REMARKS

In the Final Office Action, the Examiner stated that claims 1-10 are pending in the application and that claims 1-10 stand rejected. The Applicant's claims 1-2 and 6-7 are amended by this response.

In view of the amendments presented above and the following discussion, the Applicant respectfully submits that none of these claims now pending in the application are rendered obvious under the provisions of 35 U.S.C. § 103. Thus the Applicant believes that all of these claims are now in allowable form.

Rejections

A. 35 U.S.C. § 103

The Examiner rejected the Applicant's claims 1-10 under 35 U.S.C. § 103(a) as being unpatentable over Boyce (U.S. Patent No. 5,726,711) in view of Uchimi et al. (U.S. Patent No. 6,078,721, hereafter "Uchimi"). The rejection is respectfully traversed.

The Examiner alleges that regarding claim 1, Boyce teaches a method of recording onto a storage medium a video segment including almost all of the elements of the Applicant's invention but that Boyce fails to disclose selectively converting at least one predictive picture into an intra picture thereby replacing at least one predictive picture with intra picture in video segment as taught and claimed by the Applicant. As such, the Examiner cites Uchimi teaching selectively converting at least one predictive picture into an intra picture thereby replacing at least one predictive picture with intra picture in video segment as taught. The Applicant respectfully disagrees.

More specifically, the Applicant agrees that Boyce fails to teach, suggest or make obvious the above described aspect of the Applicant's invention, however, the Applicant further submits that the teachings of Uchimi fail to bridge the substantial gap between the teachings of Boyce and the invention of the Applicant.

Prior to addressing the outstanding rejections, the Applicant will briefly summarize various embodiments of the Applicant's invention to better assist the Examiner in appreciating the differences between the claimed invention and the prior art references. Embodiments of the Applicant's invention include a method

and system for improving trick mode capability of a digital video data stream by converting non-intra pictures of the video data stream into intra pictures. Non-intra pictures, including predictive pictures, are decoded with reference to intra pictures or other non-intra pictures (see Specification, p. 1, lines 10-14). In contrast, intra pictures can be decoded without reference to any other picture (see Specification, p. 1, lines 11-12). Both intra and non-intra pictures are segmented into macroblocks. Intra pictures are composed entirely of intra macroblocks, which do not reference other pictures, while only a portion of predictive pictures may be encoded with intra macroblocks (see Specification, p. 1, lines 20-22).

To properly decode a predictive picture, a sufficient number of intra macroblocks from previous pictures are stored and decoded (see Specification, p. 1, line 22 to p. 2, line 16). Prolonged delays in presenting properly decoded predictive pictures of a video data stream may arise during a trick mode operation, such as fast forward and reverse, because pictures that comprise intra macroblocks may be skipped in such operations (see, e.g., Specification, p. 3, lines 9-15).

In the invention of the Applicant, to reduce the delay in presenting a trick-mode video stream, "introductory" predictive pictures are converted into intra pictures (see, e.g., Specification, p. 11, line 22 to p. 12 line 2). An introductory picture is a picture that is used to properly decode a subsequent predictive picture, although it is not itself initially properly decoded (see, e.g., Specification, p. 2, line 16 to p. 3, line 3; p. 10, line 15 to p. 11, line 6; p. 11, lines 12-19). For example, according to one embodiment, a received video data stream is composed entirely of predictive pictures comprising intra macroblocks and non-intra macroblocks (see Specification, p. 9, lines 9-20). In this instance, several predictive pictures received may not be properly decoded because the system does not have access to prior pictures to which the predictive pictures refer (see, e.g., Specification, p. 2, line 16 to p. 3). Situations in which predictive pictures may not be properly decoded arise, for example, when the predictive pictures are the first pictures received in a data stream or they are the first pictures received after predictive pictures are skipped (see, e.g., Specification, p. 2, line 16 to p. 3; p. 11, lines 12-19). Several of these introductory predictive pictures are stored and referenced to

properly decode a single subsequent predictive picture (see, e.g., p. 10, line 15 to p. 11, line 6).

In one embodiment of the Applicant's invention, introductory predictive pictures are converted into intra pictures and the original introductory pictures in the data stream are replaced with the converted pictures (see Specification, p. 11, line 22 to p. 12, line 5). The conversion of introductory predictive pictures into intra pictures reduces the delay in presenting a trick-mode, as the replacement increases the number of intra macroblocks accessible during a trick mode. Claim 1 of the present invention, including, inter alia, the above discussed embodiment, recites: "[a] method of recording onto a storage medium a video segment, comprising the steps of: receiving said video segment, wherein said video segment contains at least one introductory predictive picture containing intra macroblocks; and selectively converting said at least one introductory predictive picture into an intra picture thereby replacing said at least one introductory predictive picture with said intra picture in said video segment."

Boyce is directed to a method and system for generating a trick mode stream comprising only intra frames (see, e.g., Boyce, column 4, lines 20-28). The method described in Boyce begins by parsing a received data stream to identify intra macroblocks in the stream (see, e.g. Boyce, 12, 14, Fig. 1; column 6, lines 56-60; column 7, lines 4-12). Intra macroblocks from several predictive frames are selected and combined to form an entirely new composite intra frame (see Boyce, 18, Fig. 1; column 7, lines 62-67). The newly generated intra frames are outputted to present a trick mode presentation (see Boyce, column 8, lines 13-22).

Uchimi teaches a video storage device that both receives video data streams from a network of terminals and transmits video data streams to the terminals (see, e.g., Uchimi, Fig. 4). The video data streams stored and modified by Uchimi include intra frames dispersed throughout the stream with an intra frame at the head of each video sequence (see Uchimi, column 5, lines 62-65; column 6, lines 6-24). Trick modes may be instituted on the terminals by presenting only the intra frames (see Uchimi, column 6, lines 10-14). Uchimi specifically addresses the problem of providing trick mode presentations of video data streams to a plurality of terminals having different intervals of intraframe coding (see Uchimi,

column 6, lines 1-5 & lines 17-24). Thus, Uchimi aims to selectively adjust trick mode speed independent of the terminals used (see Uchimi, column 6, lines 17-24).

The method disclosed in Uchimi begins by receiving a data stream from a terminal network (see, e.g., Uchimi, 51, Fig. 15; column 11, lines 16-19). Non-intra Frames of the data stream are restored (decoded) and then encoded as intra frames (see, e.g., Uchimi, Fig. 16; 52, 53, Fig. 15; column 11, line 20-22). Subsequently, in Uchimi the newly encoded intra frames are stored in a storage device and transmitted to a terminal (see, e.g., Uchimi, 51, Fig. 15; column 11, lines 24-40). The newly encoded data stream may be transmitted in ordinary speed or in trick mode at any desired rate (see, e.g., Uchimi, column 11, lines 31-37).

Boyce and Uchima, taken singly or in any combination, however do not teach, suggest or render obvious at least the feature of "selectively converting said at least one introductory predictive picture into an intra picture thereby replacing said at least one introductory predictive picture with said intra picture in said video segment," as taught in the Applicant's Specification and as claimed in at least the Applicant's claim 1. That is, Boyce does not teach or suggest conversion and replacement of any type of predictive picture in a video segment. As discussed above, Boyce extracts macroblocks from several different frames and combines them to form an entirely new frame. Indeed, the Examiner has conceded that Boyce does not teach converting a predictive picture to an intra picture and replacing the predictive picture with the intra picture in a video segment (see, Office Action dated June 18, 2007, p. 2, paragraph 3).

In addition, Uchima fails to teach or suggest a conversion of an introductory predictive picture to an intra picture and replacing the introductory predictive picture with the intra picture in a video segment. As discussed above, an introductory predictive is used to properly decode a subsequent predictive, but is not itself initially properly decoded. Uchima does not teach or suggest converting introductory predictive pictures. As stated above, Uchima only converts pictures that are properly decoded (see Uchima, Fig. 16; column 11, lines 20-24). Nowhere

does Uchima suggest converting to an intra picture a predictive picture that is not initially properly decoded.

As such and for at least the reasons recited above, the Applicant respectfully submits that Boyce and Uchimi, alone or in any allowable combination, fail to teach, suggest or render obvious at least the Applicant's claimed invention, arranged as in at least the Applicant's independent claims and specifically claim 1.

Therefore, the Applicant submits that for at least the reasons recited above, independent claim 1 is not rendered obvious by the teachings of Boyce and Uchimi, alone or in any allowable combination and, as such, fully satisfies the requirements of 35 U.S.C. § 103 and is patentable thereunder.

Likewise, independent claim 6 recites similar relevant features as recited in the Applicant's independent claim 1. As such, the Applicant submits that for at least the reasons recited above, independent claim 6 is also not rendered obvious by the teachings of Boyce and Uchimi, alone or in any allowable combination and also fully satisfies the requirements of 35 U.S.C. § 103 and is patentable thereunder.

Furthermore, dependent claims 2-5 and 7-10 depend either directly or indirectly from independent claims 1 and 6, respectively, and recite additional features therefor. As such and for at least the reasons set forth herein, the Applicant submits that dependent claims 2-5 and 7-10 are also not rendered obvious by the teachings of Boyce and Uchimi, alone or in any allowable combination. Therefore the Applicant submits that dependent claims 2-5 and 7-10 also fully satisfy the requirements of 35 U.S.C. § 103 and are patentable thereunder.

The Applicant reserves the right to establish the patentability of each of the claims individually in subsequent prosecution.

Conclusion

Thus the Applicant submits that none of the claims, presently in the application, are rendered obvious under the provisions of 35 U.S.C. § 103(a). Consequently, the Applicant believes that all these claims are presently in condition for allowance. Accordingly, both reconsideration of this application and its swift passage to issue are earnestly solicited.

CUSTOMER NO.: 24498
Serial No. 09/904,022
Reply to Office Action dated: 06/18/07
Response dated: 09/04/07

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PU010149

If however, the Examiner believes that there are any unresolved issues requiring adverse final action in any of the claims now pending in the application, or if the Examiner believes a telephone interview would expedite the prosecution of the subject application to completion, it is respectfully requested that the Examiner telephone the undersigned.

No fee is believed due. However, If a fee is due, please charge the additional fee to Deposit Account No. 07-0832.

Respectfully submitted,
Donald Henry Willis

By: _____
Jorge Tony Villabon, Attorney
Reg. No. 52,322
(609) 734-6445

Patent Operations
Thomson Licensing Inc.
P.O. Box 5312
Princeton, New Jersey 08543-5312

September 04, 2007